Collisions of three-dimensional bipolar optical solitons in an array of carbon nanotubes

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Résumé en anglais	We study interactions of extremely short three-dimensional bipolar electromagnetic pulses propagating towards each other in an array of semiconductor carbon nanotubes, along any direction perpendicular to their axes. The analysis provides a full account of the effects of the nonuniformity of the pulses' fields along the axes. The evolution of the electromagnetic field and charge density in the sample is derived from the Maxwell's equations and the continuity equation, respectively. In particular, we focus on indirect interaction of the pulses via the action of their fields on the electronic subsystem of the nanotube array. Changes in the shape of pulses in the course of their propagation and interaction are analyzed by calculating and visualizing the distribution of the electric field in the system. The numerical analysis reveals a possibility of stable post-collision propagation of pulses over distances much greater than their sizes.
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